

Athena Data Analysis Needs

- **Calibration:** higher S/N spectra will require commensurate higher accuracy in calibration.
- **Extended source analysis** (e.g. clusters of galaxies), more effected by:
 - Backgrounds (particle and photon)
 - position-sensitive changes in response, gain, PSF
 - energy-sensitive PSF, particularly large-angle scattering contaminating primary spectra
- **Forward-modeling:** needed when simultaneously fitting physical 3-d models to different datasets (different X-ray telescopes, SZ observations, lensing), Develop tools to project 3-d physical models (idealized 3-d models and simulation data) to predict and model Athena observations
- **Statistical tools:** allow fitting of idealized models with a limited set of parameters; perform goodness-of-fit tests and parameter explorations (and in principle allow simultaneous fits to multi-wavelength data, including archival X-ray data)
- **Systematics: include in the analysis:** Include backgrounds, scattered light / PSF effects, response uncertainties as a function of energy and position. Solutions such as JACO (Mahdavi+) are a step in this direction but resources are required to advance the any tools to the required level of flexibility, portability, and usefulness for a broader user community.